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Technological Approaches to Microcredit and Crop Agriculture in Sustainable Development

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***Abstract*- In many developing countries, the majority of poor people reside in rural areas and are dependent on agriculture, especially crop agriculture, for their livelihood. These agriculturalists confront climatic and price risks, seasonality demands and surpluses of labor and capital and often live in areas that are hard to address with financial services. Approximately seventy percent of the poor live in rural areas, a majority of whom depend upon agriculture for their livelihoods. And, especially in the poorest countries, a larger number of the agricultural workers are women. Hence, by its mandate and mission, institutions and organizations involved in microcredit cannot exclude agricultural finance; they cannot shy away because of its perceived and actual risks. They also cannot only finance livestock and agricultural trading activities because they are less risky. This paper reviews innovative approaches and technologies so that microfinance can be better adapted to fit the conditions of crop agriculture, improve the management of agricultural risk and encourage agricultural investment thus better address food insecurity among the poor.**

Keywords: **Crop, Microcredit, Development, Farmer, Agriculture.**

I. INTRODUCTION

Agriculture constitutes an important—indeed major—part of developing countries' GDP (FAO, 2006 and World Development Report, 2008) and a large part of rural households' monetary income. Agricultural income is generally considered to be volatile due to its dependencies to production (weather, pests and diseases) and market (commodity prices) risks [9]. Agriculture has returned to being a primary global concern. Prices of agricultural goods, such as cereal and milk, are hitting record highs on international markets. Food security is no longer guaranteed. High food prices are a short-term problem for consumers, especially among poor population in southern countries. On the other hand, high-performing agricultural markets have the potential to stimulate a new wave of investment and innovation. They give struggling peasants in southern countries a chance to earn a decent living. But to take advantage of this historical situation that so many have been waiting for, farmers will need to invest and increase production.

Crop agriculture is the most important segment of agriculture for generating rural employment and income or smallholder farm families. Due primarily to their lack of resources to generate sufficient income and safety-net ―cushions‖ to sustain them in times of difficulty, many live in poverty and are vulnerable to hunger, disease and malnutrition, especially the smallest or micro-level producers [5]. Although many of the poor own or have land-use rights, many others must rent land through share-cropping leasing plots of land. These land plots are often too small, resource-poor and fragmented to adequately produce for the family and to generate the necessary income to meet their food and livelihood needs. Their livelihood security depends upon having a successful harvest, or multiple harvests according to the location and nature or production. Many variables, both controllable and non-controllable, affect this outcome. Controllable factors include not only their personal capacity, skills and technologies, but also and importantly their access to land and water, seeds and fertilizers, tools and equipment, storage and transport, markets and market information and timely and adequate financial services. Non-controllable variables typically include weather, market volatility and major disasters of any type, including health [11].

Financial sectors in developing countries are often characterized by low financial intermediation (i.e. bank credit in relation to the Gross Domestic Product), low diversification but high profitability. Consequently, large shares of financial assets are held by few highly profitable regular banks which mainly focus on urban situated large enterprises [12]. As long as profits are high and competition is low regular banks will continue to focus only on highly collateralized investments with low credit risks, which are rarely found in the micro, small and medium enterprise (MSME) sector and especially not amongst small scale agricultural producers. Frequently, it is reported that farmers in developing countries are credit rationed [19]. But most of the investigations on access to credit for farmers have two major shortcomings: First, they generally do not consider comparisons with other sectors. Therefore, it is difficult to judge whether credit rationing is a general problem in the investigated economy or a phenomenon that only appears in the agricultural sector. Second, they only focus on access to credit but cannot account for the credit risk even if some of these investigations like [16] and [7] link rationing effects to firm characteristics. In developed countries, agricultural banks played an important role in modernization of agriculture and bankerization early on. In developing countries, microfinance has the potential to play this role, given its advantage in terms of proximity to the client and its frequent association with cooperative approaches. These characteristics are can be found in the approaches originally used by local agricultural banks [3].

The term ‘microfinance' means providing very poor families with very small loans (microcredit) to help them engage in productive activities or develops their tiny businesses [22]. According to the Consultative Group to Assist the Poor (CGAP), microfinance is the supply of loans, savings and other basic financial services to the poor, including working capital loans, consumer credit, pensions, insurance and money transfer services. Microfinance is also defined as “providing small loans to the extremely poor people for self employment to generate income which facilitates themselves and their families”. Microcredit, or using the term more broadly to include all types of microfinance, is especially focused on serving the vulnerable segments of the population who have less or no access to financial services, such as women and farmers without collateral and/or stable incomes. These are often in harder-to-reach regions and rural areas. Approximately seventy percent of the poor live in rural areas, a majority of whom depend upon agriculture for their livelihoods. And, especially in the poorest countries, a larger number of the agricultural workers are women. Hence, by its mandate and mission, institutions and organizations involved in microcredit cannot exclude agricultural finance; they cannot shy away because of its perceived and actual risks. They also cannot only finance livestock and agricultural trading activities because they are less risky. Microfinance program has been dramatically increased in last two decades [20]. Microcredit plays an important role in agricultural development. One element of an effective strategy for poverty reduction is to promote the productive use of farm inputs. This can be done by creating opportunities for raising agricultural productivity among small and marginalized farmers. Microcredit is particularly relevant to increasing productivity of rural economy, especially agricultural productivity in such an environment where economic growth is occurring, microcredit also has the capacity to transmit the benefits of growth more rapidly and more equitably through the informal sector. It is well documented that for many small scale farmers, lack of access to financial services is a critical constraint for the establishment or expansion of viable agricultural enterprises.

Microfinance seems to be one of the effective solutions to removing poverty of the people. It helps to improve people income and the standard of life. It can help people to establish their own business and decrease their poverty. Majority of the population lives under the poverty line which prevents people from clean water due to pollution, sufficient food, proper housing, education, employment, technology, communication and healthcare (Saad, et. al. 2014).

Micro credit presents the poor with income, food, shelter, education and health and can therefore have immediate and long term consequences. Micro Finance Institution loans are used for agricultural production, trading, processing and transport, resulting in an increase in the use of agricultural inputs and increased output of agricultural production. This leads to enhanced employment opportunities in these sectors for the wider community and reduction in the prices of such products due to increased supply. They also state that trading activities financed by MFIs can help to establish new marketing links and increase the income of traders, and this can lead to reduced migration due to increased employment opportunities and increased income [23]. In order to improve farmers' conditions, there is a need to improve the agricultural production of their farms. Increase in agricultural production will enhance the demand for inputs but the majority of farmers lack financial resources for adopting agricultural innovations. Rural credit in the form of loans, cash or commodity is the only alternative left for the farmers' improvement purpose. Microfinance is emerging a survival strategy of rural families in developing countries. It has proven that micro credit is a powerful tool for poverty reduction by improving the ability of poor people to increase incomes and build assets [10]. Microfinance promoter favor raising lending rates to market levels to improve cost recovery. In credit market, informal lending is much costly than formal lending but formal lending have long process which poor people borrow [4]. Microfinance plays a key role in fighting against poverty to build income and property. It is the main source for poor to maintain their economic lifestyle in developing countries [8].

The agricultural sector is different from other economic sectors in a number of ways. Activities are generally located in isolated areas with low population density and poor infrastructure. They are dependent on weather and production cycles; income is seasonal and monetary income is limited. Microcredit may enable small and marginalized farmers to purchase the inputs they need to increase their productivity, as well as financing a range of activities adding value to agricultural output. However, much remains to be done, to integrate microcredit institutions fully into the mainstream of rural financial systems and for commercial banks to recognize their full potential [13]. A major setback to farmers, especially small holder farmers of developing countries who typically have limited collateral capabilities from reaping such benefits appears to be their inability to pay back loans [15]. Available literature indicates that the countable few of this group of farmers who have access to loans usually end up selling their assets to defray these loans as they often come with interest charges. Consequently, some researchers opinioned that microcredit has a counterproductive effect on farmer incomes [2].

Agricultural prices are notoriously volatile and few farmers can offer guarantees that are legally or financial acceptable. These specificities demand financing mechanisms adapted to the diverse needs and services of rural households [21]:

- Short-term: input financing at the beginning of the crop year (seeds, fertilizers, pesticides), additional labor, feed, storage facilitates, processing, etc.
- Medium and long term: equipment for intensification, commercialization (transportation), storage (buildings), perennial crops (investment, renewal, maintenance), (re)constitution of herds, land purchase.
- Family needs: personal, durable goods, housing.
- Savings
- Non-financial services: monitoring demand, technical assistance and extension.

It has become an issue in development circles as agriculture remains a key activity in less developed countries particularly, in Africa [2]. Whiles there exist limited empirically work on the subject, the results of the very few suggest that microcredit has played an integral role in uplifting the poor particularly farmers by cushioning them against shocks in the agriculture sector [6]. This viewpoint is based on the well-grounded premise that the farmers will put the credit to productive use by acquiring agricultural assets which they previously could not afford, adopt modern technologies and improved methods of farming which consequently enhances agriculture income and well-being of these group of individuals.

Sociological perspective of micro finance emphasize that access to credit provides the poor with productive capital that helps to build up their sense of dignity, independence, and self-confidence, and hence are motivated to become participants in the rural economy. Micro credit presents the poor with income, food, shelter, education and health and can therefore have immediate and long term consequences [1]. The goal of microcredit and that of the members of the MicroCredit Summit is to serve the poor and assist them with financial and related nonfinancial services that can help them rise out of poverty. So many of them depend upon crop agriculture for their food and livelihood security; yet, for many of them their food and income is not secure. Through this program income inequalities and poverty has been reduced and is applied successfully in many countries. Microfinance is the source of socio-economic development of poor and small scale business holders. It morally and ethically motivates a poor to work for self employment. The loan is given to the poor's for generating project and expansion of business and its term and conditions are flexible and easy to understand. The expansion of loan is quick and fast as well as easy. Microfinance helps an individual to become independent economically and provides additional income generating activities [17].

The researcher tried to explore, how microfinance impacts on farmers social and economic life and uplift their standard of life through the means of health, transportation, clothes and shelter. The researcher aimed to explore the effect of loan on farmer's life; to identify the social and cultural gaps those compel farmers in debts and give suggestions for policy makers in designing of micro financing products.

MATERIALS AND METHODS

The research was design with investigation from farmers through questionnaire. The results of the questionnaire are used to test the assumption of hypotheses. Information were collected from farmers via face to face interaction. The questionnaires is a self designed comprising twenty (20) question items relating to micro-credit financing in Agricultural production. 100 questionnaires were printed and distributed to farmers while only 91 were retrieve and administered correctly. The research instrument (questionnaire) was presented to various scholars for necessary amendments and corrections before the administered. The question items were set based on the idea of farmers in collecting micro-credit finance and how the micro-credit finance has been contributing to their production. The administration of questionnaire was done face to face and door to door to avoid experimental errors. Data collection was done face to face. Questionnaire was given to literate farmers to read the questions item and they are able to answer the question correctly.

RESULT AND DISCUSSION

TABLE 1: Distribution of Respondents by Socio-Economic Profile

	Frequency	Percent	Valid Percent
Sex			
Male	30	60	60
Female	20	40	40
Education			
None	23	46	46
Primary	16	32	32
Secondary	8	16	16
First Degree	1	2	2
Others	2	4	4
Marital status			
Married	46	92	92
Divorced	3	6	6
Widow	1	2	2
No of children			
None	1	2	2
10	2	4	4
20	3	6	6
30	7	14	14
40	8	16	16
50	5	10	10
60	15	30	30
70	4	8	8
80	3	6	6
100	1	2	2
150	1	2	2
Age			
Above 20 below 30	7	14	14
Above 30 below 40	13	26	26
Above 40	30	60	60
Occupation			
Farming	42	84	84
Trading	3	6	6
Others	5	10	10
Total	50	100	100

From Table 1, 60% of the respondents are male while 40% are female. This shows gender interest in Agricultural business in a typical rural area were men. Also, 46% of the respondents are illiterate, 32% are primary level of Education, 16% are secondary level, 2 % of degree holder while 4% are other level of Education e.g. Technical School, school of cooperative e.t.c. Large population of respondent are unable to read and write, it even lead to inability to keep the proper record of their farming activities/operation. 92% of respondents are married 6 % are divorced while 2% are widow. Then 4% of respondents give birth to children above nine (9), these respondents enjoyed family labour through fulting of the effort of their children. 96% of respondents give birth to children below nine (9).

TABLE 2:- Determinants on the Types, Sources, Size, Adequate, Effect and Rating of Micro Credit Financing.

	Frequency	**Percent**	**Valid Percent**
Type of farming			
Arable Crop Farming	43	86	86
Tree Crop Farming	7	14	14
Financial sources			
Personal saving	3	6	6
Co-operative Societies	47	94	94
Source of micro-credit finance			
Nig. Agric & Credit Bank	1	2	2
Co-operative Societies	46	92	92
Family	3	6	6
Size of micro-credit enjoyed			
Not applicable	3	6	6
Less Than 2500	20	40	40
Between 2500-50000	17	34	34
Between 50,000-100,000	7	14	14
Between 100,000-200,000	1	2	2
Between 200000-500000	1	2	2
Above 500,000	1	2	2
Adequate of micro-credit financing			
Not applicable	3	6	6
Very Adequate	1	2	2
Adequate	16	32	32
Not Adequate	30	60	60
Effects of micro-credit financing			
Not applicable	3	6	6
High Effect	2	4	4
Moderate Effect	17	34	34
Little Effect	28	56	56
Stages of farm operation that Micro Credit has impact.			
Not applicable	2	4	4
Preparatory stage	46	92	92
Nursing (Planting)	2	4	4
Adequacy of micro credit financing			
Not applicable	3	6	6
Very Adequate	4	8	8
Not Adequate	30	60	60
Rating of the effect of micro credit financing			
Not applicable			
High effect	3	6	6
Moderate effect	3	6	6
Little effect	24	38	38
No effect	24	48	48
	1	2	2
Total	50	100	100

The farmers usually give birth too many children, perhaps with the belief that their children would serve as source of labour for their farming activities. 14% of respondents are fall within age bracket of 20-30 yrs, 26% are above 30 but below 40, while 60% are above 40. from the table also, 84% of respondents are fulltime farming, 6% are trader in conjunction with farming while 10% are others like driver, mechanic, Teacher e.t.c. with small scale farming.

From the above table, 86% of respondents are arable crops farmers while the rest 14% are tree crops farmers meaning that farmers are more interested in arable crop farming, because it is a seasonal production. 6% of the respondents source their financing capital from their personal saving while 94% source money to finance their farming operation from co-operative societies. Farmers are exposed/en-lighted to cooperative societies as source of micro credit financing for their farming. Also, 2% of respondents source their micro credit finance from Nig. Agric & Credit Bank, 92% source Micro Credit finance from co-operative societies. 6% depend on family account to finance their farming operation. In this typical rural area, large population of farmers depend on cooperative societies through pooling of their resource. Farmers are enlightened to cooperative societies as micro credit finance institution. Meanwhile, 6% of respondents are not applied to micro credit institution to finance their farming operations. 40% of respondents enjoyed the size that less than ₦25,0000, 34% are enjoyed between ₦25000-50,0000, just only 2% of respondents enjoyed between ₦25000-500,0000 for the purpose of commercial farming. The table also reveal that 6% respondents are not applicable, 2% enjoyed very adequate of micro credit, 32% submit that the size is moderate Adequate while 60% of respondents are discourage through inadequate size of micro credit finance giving to them. 6% of respondents are not even obtaining micro credit, they depend only on family account to finance their farming operations.

The effect of micro of credit is high on the farm production of 4% of farmers, 34% encourage through moderate effect of micro credit on their farm production while 56% of respondents proclaimed little effect of micro credit finance. High percentage of farmers appreciates the effect of micro credit finance on their production as little effect. Then 4% of respondents are not even applying for micro credit, 92% make use of micro credit at preparatory stage while 4% use micro credit during the nursery stage (after planting), for operation like, weeding, fertilizer application, control of pest and disease e.t.c. In this typical rural area, farmers needs micro credit as from the onset of production for operation like bush clearing, making ridges e.t.c. 6% of respondents are not applicable, 8% enjoyed very adequate of micro credit to their farm operation stages, 26% enjoyed adequate financing while 60% of respondent submit that micro credit seem to be inadequate to their farm operation stages.

In a nutshell, high percentage of farmers proclaim inadequacy of micro credit finance to their farm operation stages. 6% of the respondents are family account dependent, 6% rate the effect of micro credit to farm operation stages as high. Moderate effect submit by 38% of respondents, 48% of farmers have little effect while 2% of respondents submit that, there is no effect of micro credit finance on their farm operations stage. Larger number of farmers enjoyed little effect of micro credit finance on their farm operation stages.

Access to finance is therefore decisive. Yet the majority of peasants in developing countries are still excluded from the banking system. Bank penetration rates in agricultural regions of Africa and South Asia are barely over 5-6% [3]. Accordingly, [14] in their study came to the conclusion that microcredit provided a significant boost to production and income levels of farmers in Akwa Ibom state in Nigeria, which further helped improve their living conditions.

The findings in this paper shows that there is a positive relationship between microfinance bank loans and gross domestic products which means that an increase in microfinance bank loans will bring about an increase in GDP; there is a positive relationship also between the financial sector output (FSO) and gross domestic product(GDP), which implies that an increase in financial sector output will result to an increase in GDP; likewise a positive relationship also exist between government expenditure and gross domestic product which means an increase in government expenditure will bring about an increase in GDP.

Since microfinance bank loans, financial sector output, and government expenditure has a positive impact on gross domestic product, therefore microfinance bank loans will promote agricultural productivity and development. Microfinance bank loans have a vital role to play in the agricultural sector in Nigeria. Because of this, microfinance bank loan serve as a catalyst for agricultural development in Nigerian economy.

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